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FURTHER OBSERVATIONS ON INTRA-ABDOMINAL ADHESIONS.

By JAMES VANCE, M. D., El Paso, Texas.

Read Before 38th Meeting of the New Mexico Medical Society, Roswell, N. M.

Several years ago the writer covered this subject fairly comprehensively in a paper read before this society, (The Bulletin El Paso, May 1916), and he now proposes to recount briefly, a few additional observations he has made and report some cases that are of interest in this connection.

The causes of intra-abdominal adhesions are due: (1) to inflammation; (2) to trauma, and (3) to toxic influences. Traumatic post-operative adhesion may be produced by excessive or careless manipulation of the abdominal viscera during the progress of operation, or they may be produced by hernia. Toxic adhesions are produced most commonly by ruptured ovarian cysts or other toxic fluids within the abdomen.

It may also be well to review briefly the various attempts at prevention of abdominal adhesions by both foreign substances and autogenous grafts. Two dozen or more substances said to prevent intestinal adhesions have been tried out and found more or less worthless. Among these many substances, Cargyle membrane, olive oil and paraffine oil obtained the most notoriety, and apparently were attended with the best results. Cargyle membrane was introduced many years ago with much enthusiasm, only to sink gradually into desuetude. Olive oil and paraffine oil have been used in as much as 2000 c. c. or more, being put into the abdomen before closure.

Four or five years ago Saxton Pope introduced his hypertonic Sodium Citrate solution used in the peritoneal

cavity to prevent adhesions. This solution promised to be of considerable value, but since that time little seems to have come of it.

On the whole, it may be said of all these extraneous substances, said to prevent intestinal adhesions, that they are foreign bodies and act as such. There has been no real evidence to show that better results have been obtained by their use than with out them.

Autogenous grafts of peritoneum, omentum or fat comprise the most useful methods of preventing post-operative or recurrent adhesions. These seem to be of considerable use and it is reasonable that it should be so, since their use follows well recognized and well established surgical principles.

In presenting the few additional observations in this subject that the writer has made in the past few years, it will probably serve the purpose best to report some illustrative cases, and then make deductions from these. The first case illustrates apparently that the autogenous graft is of some value. This case was reported in the paper above referred to and is now reported again, because since that time it has been necessary to re-open his abdomen, and thereby we were enabled to see what autogenous grafts had apparently accomplished.

A man 55 years of age, ten years previously had an acute attack of appendicitis which was not operated upon until it had ruptured and indications of a general peritonitis were present. The man was a powerful athletic sort of a fellow, and thinking he could ward off this sickness by his mere strength, neglected himself until he was in the serious condition described. The abdomen was opened and drainage instituted—nothing else could be done on account of the seriousness of his condition. Drainage continued for four months when the second operation was performed. At this second operation the appendix was removed, and presumably some of the abdominal adhesions separated. This operation was followed by a hernia, for which he had to wear a supporter during the next four years. During this time the man's health was fair, except for various attacks of gas pains and increasing constipation. Five years ago he was seized with severe attacks of gall stone colic, and, it was at this time that we first saw him.

The abdomen was opened by the regular gall stone incision. A solitary gall stone was removed from the gall bladder and gall bladder drained but not removed.

This case up to this point was reported in the paper referred to, and read before this society some four years ago. In the history of that operation I find that 12 feet of adhesions of the jejunum and ileum were separated. Special note was made of the fact that the jejunum was adherent to the abdominal wall for 8 or ten inches which when separated left a deep raw area from one-half to an inch wide for the whole length of the adhesion. A detached flap of peritonium was cut from the hernia sack and sutured in place over the raw surface. The same was done at the ileocecal valve adhesion and numerous other points.

The hernia was a large one and the abdominal wall was greatly thinned as we always find in large hernias of long standing. The fascia was turned over from the rectus muscle and well lapped over the hernia area giving a good closure. The jejunal adhesion above described was only 3½ feet be-

low the stomach and had caused him a very great deal of trouble. Following this operation the patient remained well for four years, then he gradually developed a comparatively small hernia in the lower angle of the old appendix wound. During the following year this hernia became more pronounced and symptoms of gas pains and other milder indications of obstruction began to reappear. He developed pains in the stomach and occasional vomiting. The X-Ray findings again seemed to indicate the obstruction was close to the stomach, bearing out the clinical observation that he was nauseated shortly after beginning to eat, and if he continued to eat he would vomit. In November, 1919, these symtoms became so pronounced that he presented himself for further operative procedure. The abdomen was again opened through the old appendix wound, and it was interesting to note that, whereas before, almost the entire abdominal cavity, at different places, showed severe adhesions—there were at this time, adhesions only in the hernia sack which had developed at the lower angle of the old appendix wound. The rest of the abdomen was entirely free.

Having looked up the history before opening the abdomen, the various points of adhesions at our first operation were especially examined. The long denuded area of the jejunum 3½ feet below the stomach on which the large peritoneal graft was put was so perfectly healed, that if I had not had the history to go by, it could not have been told there was ever any trouble with the bowel. In the hernia sack, however, about 2 feet of the ileum was badly inflamed and so twisted upon itself that it formed an almost complete obstruction. This obstruction was relieved and the adhesions separated and the hernia sack carefully closed. The man made an easy recovery and could eat anything he wanted to, and the bowels moved with little difficulty from this time on. In April, 1919, he was again seized with pain in the gall bladder region attended by fever and chilly sensations. The writer was out of town at the time, so the patient got on a train and went to St. Louis for operation. There was found an empyema of the gall bladder and drainage only was done. Two months later, here, in El Paso, the gall bladder became again filled with pus. He was taken to the hospital and the gall bladder removed. He made a nice recovery and is now perfectly well. He will remain well unless another hernia develops in the old appendix wound. In this event he will again develop adhesions in the hernia sack and in time he is only too likely to have to be reoperated.

Obviously so many operations are all wrong, but fortunately the burden lies on his own shoulders because, had the appendix been removed at the proper time the serious sequellae would not have happened. Further, it shows that could he have escaped the hernia after the first operation that we performed for him for intestinal adhesions, he would have probably had no further trouble from that source. For we all know, that in practically every case of post-operative hernia (and umbilical hernia as well) extensive intestinal adhesions are formed within the sack. This is nature's effort to close the breach in the abdominal wall. Again, this case shows that the gall bladder

should have been removed at the first operation, and we would have done this had it not been that the adhesions were so extensive and he was suffering so acutely from them that we deemed it was necessary to attempt to cure the adhesions and chance the gall bladder getting well by simple drainage. As it was, the operation required over two hours of hard work and at that time we did not dare add additional trauma of removal of the gall bladder.

The next case that we wish to report is that of a young man of 28 years, who was gassed while in the battle of the Argonne Forest in France, from which he was confined to the hospital for several months. This left his lungs in bad condition from which he apparently developed tuberculosis. Following this gassing he also had pains in the stomach and abdomen. Dr. McCamant reports that he saw this man in France shortly after he was gassed, and that he then complained more of pains in his stomach and abdomen than in his lungs. On returning to this country he was sent to Hendricks-Laws Sanitarium for tuberculosis, and there he developed his third attack of acute appendicitis. Though he was in poor condition it was wise to operate at once. He was sent to Hotel Dieu and there operated upon. The appendix was full of pus and numerous adhesions of the cecum colon and terminal ileum were present, but on account of the inflammatory condition present it was not thought wise to separate the adhesions present. The abdomen was closed without drainage and he made an easy recovery from the operation, but three or four months later he began to be constipated again; to have gas pains in the abdomen attended by loss of appetite. He only weighed 120 pounds at the time and again began to lose flesh. After endeavoring in all sorts of ways to relieve his obstipation, it was decided to operate again. This, in spite of the fact that the X-Ray seemed to show that the bowel was emptying itself satisfactorily, but the clinical picture of the partial obstruction was so clear that operation was clearly indicated. The abdomen was again opened—seven months after the first operation—and it was found that the adhesions were very much more extensive than at the time of the first operation. At this time, there being no inflammatory condition within the abdomen, all adhesions were carefully separated and the entire abdomen examined. It was found that this patient had only a rudimentary omentum — practically none at all. There was not a particle of fat in the man's abdomen with which to cover raw surfaces of the intestines, and practically no omentum. Aside from separating the adhesions in such a way that they could be used for covering up the raw surfaces, nothing else was done. The abdomen was closed and the patient was put on a milk diet a few days later, and this was continued for about 8 or 9 weeks until the patient had gained 35 pounds. Since then the patient has remained at about 150 pounds weight. Being a man of small stature this is a very good physical condition for him. He still has slight inconvenience from constipation, but he is so relieved that he feels that he is well.

Now, the object lesson of this case seems to me to be two things; First, any patient who is very thin and has no fat in the abdomen is a very poor

patient to operate upon in the hopes of relieving intestinal adhesions, unless something is done immediately after operation to increase his weight, and consequently increase the fat in the abdomen. It would be better in these cases, if possible, to have them gain weight and so create fat within the abdomen prior to operation, but unfortunately this cannot usually be done. Second: What effect, if any, did the severe gassing that he had in France have upon the production of adhesions in his intestines? Certain it is that adhesions were formed out of all proportion to what would be expected, considering the pathology present at the first operation.

The third case I would like to report is that of a woman about 35 years of age, who, seventeen years ago was seized with violent pain in the abdomen and the condition not being recognized as surgical was allowed to continue for a week or more before she was finally operated upon. Unfortunately an abcess had formed beneath the right tube and ovary, and of course these structures were involved in the abscess wall. The operating surgeon thinking that the tube and ovary were to blame for the abscess, removed both. Drainage was established and the patient made an operative recovery. Following this at various intervals during the entire 17 years this patient has suffered from attacks of more or less severe peritonitis; generally of a mild degree, but occasionally quite severe. In December, 1919, after some horse-back riding she had a very severe attack, from which it was feared for a week or ten days that she would lose her life. She gradually recovered from this, but the abdomen remained distended and very tender. There was an increasing obstipation, interspersed by periods of diarrhoea—the diarrhoea however did not relieve the distension. We first saw this case in January, 1920, and on account of the distended condition of the abdomen and the inflammatory condition still present, we advised the postponing of the operation until a more propitious time. Six weeks later the abdomen was still distended and the patient was having recurrent attacks of pain, and since it was considered that she could not be gotten in a better condition, the operation was undertaken.

Examination at that time, besides the distended abdomen above referred to, revealed a tender mass in the region of the left tube and ovary and the pathology of the condition seemed to be that of a pus tube. In other respects the patient was in good condition excepting that she had had some little heart trouble, probably of septic origin.

The abdomen was opened through the old median incision made 17 years ago. Immediately upon opening the peritoneum free fluid poured from the wound and the intestines were one mass of adhesions; so much so that the uterus and entire pelvis was completely covered in and could not be explored from any point. The intestines were adherent so firmly that in a great majority of instances the adhesions had to be cut with scissors. This patient's intestines were separated from the beginning of the jejunum to practically the rectum, before the uterus and tubes could be explored. When the pelvis was finally cleared and exploration could be made it was found that the inflammatory mass in the left side, which was thought to

be the tube and ovary, was the end of a long appendix. The appendix was full of pus and extended from the cecum down into the pelvis, beneath the site of the former right tube and ovary, on behind the uterus and the end lying behind the left tube and ovary. The left tube and ovary were normal, excepting that the pressure from the inflammatory condition all about them had caused a general atrophy of both. This case was the most extensive intra-abdominal adhesions the writer has ever had to deal with, but no grafts of any kind were employed excepting the peritoneum was so cut in separating the adhesions that it could be sutured in place to cover the worst deperitonized areas. The adhesions were too extensive to deal with by grafting. The appendix was of course removed and the abdomen closed. The patient was put in bed and made a nice recovery, excepting that we had some little difficulty in moving the bowels the first three days. The bowels were moved shortly after operation so as to start peristalsis as soon as possible, with the idea that this would lessen strong adhesions. This patient made a nice recovery and, now seven months later, she tells me she is in better physical condition than she has been since she was a girl.

This goes to emphasize the lesson that the pathology underlying intestinal adhesions must be removed, otherwise old adhesions will recur or new ones form; or still more likely both. It is evident that 17 years ago this patient had an appendicitis pure and simple, but unfortunately the abscess, that the appendix caused, lay immediately beneath the right ovary and tube; the ovary and the tube being inflamed and included in the abscess wall, appeared to be the cause of the abscess, consequently both were removed. The patient made an operative recovery at that time, because the abscess was drained, but it was an operative recovery only, since dozens of times following that she had more or less severe attacks of peritonitis, due all the time to the old appendix lying beneath the tubes and uterus.

To summarize:

1. Sound surgical judgment and a good technique are the best preventatives of intestinal adhesions.

2. Extraneous materials are of little or no benefit.

3. Autogenous grafts are of great benefit in selected cases at least.

4. Beware of patients who are very thin or have no omentum in extensive and difficult operations. They are prone to form post-operation adhesions.

5. The under-lying pathology must be removed in every case.

6. Post-operative hernia must be avoided, otherwise adhesions are sure to occur and are always more or less troublesome.

DIVERTICULUM OF THE BLADDER.

By K. D. LYNCH, A. M. M. D., El Paso.

Read before the 39th Meeting of the New Mexico Medical Society, April 29,30, 1921.

Diverticulum of the urinary bladder is beginning to take a more important place in the genito-urinary surgery than formerly, not on account of its more frequent occurrence but due rather to more correct diagnoses being made in vague bladder symptom-complexes; and as such cases more frequently are sent to the genito-urinary surgeon whose equipment and experience makes for a more accurate examination, it is not remarkable that the cases reported are becoming more numerous. By reason of the close association of diverticulum with obstructing prostatic conditions at the bladder neck, it is important that it be recognized and dealt with at the same time that the obstruction is removed whether this latter operation be in the nature of a prostatectomy or a punch operation for contracture or median bar.

FREQUENCY

Up to 1904 only fifty-seven cases had been reported; Judd's latest article reports forty-four cases operated at the Mayo Clinic in the ten years from 1908 to 1918; thirty of these have evidently been since 1915. In a previous article the same clinic reported twenty-seven cases of which fourteen had been operated. Recently Hinman has analyzed 205 cases collected from the literature, 1899 to 1919, inclusive of twenty seen personally in four years. In going over the literature it is worthy to note that up to a very short time ago the articles by noted genito-urinary surgeons have been reports on one or two cases; and the fact that when one of the younger men such as Hinman is able to report twenty personal cases is evidence that these cases are now more frequently reaching the hands of the urologist and are being diagnosed. In the past five years I have treated personally thirteen diverticula of the urinary tract, one in the ureter, five in the posterior urethra, seven in the bladder.

TYPES

Briefly, two types of diverticulum are recognized, congenital and acquired; but clinically it is very difficult to differentiate one from the other on the usual grounds that the congenital variety contains all the coats of the bladder in its make-up while the acquired type consists of mucosa alone. The consensus of opinion now seems to be that a congenital deformity or lack of development is a factor in all these cases and that other causes aid in the gradual formation of the pouch, especially obstructions such as prostatic hypertrophy or contracture of the bladder neck; we may say that these obstructive conditions are in a sense natural, whereas other conditions brought on by a disease, such as stricture, do not seem potent in producing the condition. Hinman's careful examination of his own cases failed to show histological differences between the so-called congenital type and those which were acquired. In the five cases of diverticulum which we have operated upon examination showed muscle bundles in the wall of all. Personally, I do not believe that the pathogenesis of these cases is as yet possible of complete explanation; and while I fa-

vor Hinman's opinion that most, if not all, are brought about by the aid of obstructive conditions, I mention Watson's theory of congenital bands in the bladder produced by variations between the intrapelvic and intraabdominal pressure in intrauterine life as worthy of mention.

AGE

The vast majority of the cases (25%) occur between 50 and 60 years; the twenty year periods succeeding and preceding this decade also each contributing about 25%. Women are very rarely affected, less than 5% of all cases. And as it can be shown that most of the cases between 50 and 60 and beyond had prostatic hypertrophy and that those from 30 to 50 had contractures of the bladder neck it would seem that the obstruction factor mentioned above plays a very large part in their development. As we all know, urinary obstruction in women is rare and this goes apace with the rarity of diverticulum in the sex. One of my cases was in a woman and the diverticulum was really very small; I considered it simply a cellule although it had a very definite sphincter-like appearance at the opening. I would remark that there was also a peculiar conformation of the internal sphincter and a considerable ulceration at the external meatus; what role these played in the production of the cellule, I am unable to say.

LOCATION

The orifice of the pouch is situated near one or the other ureteral orifices, usually above it and to the inner side. There may be single or multiple orifices; the single orifice appeared in four cases in our series, multiple orifices in three.

COMPLICATIONS

Conditions of obstruction present are usually prostatic hypertrophy, contracture of the vesical neck, urethral stricture, or calculus. Judd especially calls attention to the fact that removal of the obstructive condition does not cure these cases unless the diverticulum is removed as well; he considers that many of the so-called cases of cystitis and residual after prostatectomy are ones in which the diverticulum has not been discovered. Pyelitis, hydroureter, are also frequent. Cancer or other tumors may be con-current in the bladder or may occur in the sac itself. Of this latter condition Thomas reports one case post mortem (Mayo Clinic) B. A. Thomas a papilloma; Geraghty writes that five have occurred in their experience and my one case adds to these.

SYMPTOMS

Difficult or frequent urination or both are the usual on-set in 75% of the cases; others noted are hematuria (this, however, I think only when cancer is associated with or originates in the diverticulum; or it takes place at the beginning of a severe cystitis), pain, acute retention, etc. Over 60% had had symptoms for five years or more. A very characteristic symptom is the feeling that the bladder is not emptying; shortly after urinating, desire comes and an equally large quantity is voided; this symptom occurred in two of our cases. Also an amount of thick pus escaping through the catheter, just as one thinks the bladder has been washed clear is an almost pathognomonic symptom, this was observed in cases one and three of our series. It is also possible at times to feel a supra-pubic tumor (cases 2 and 4). Occasionally a mass is felt by

rectum (case 2). In the other cases careful palpation failed to reveal a tumor even after the diagnosis had been definitely made.

DIAGNOSIS

Accurate diagnosis is possible only by means of the cystoscope and cystoradiography; one is adjuvant to the other, serving to substantiate evidence, which obtained by one of them alone is not conclusive. In case 1 the conditions were so puzzling that while diverticulum was suspected from the symptoms, and careful cystoscopic examinations were made, the X-ray clinched the diagnosis. In another case in which diverticulum was suspected on account of certain symptoms and also on account of failure to improve on preliminary suprapubic drainage the X-ray seemed to indicate the presence of a diverticulum; cystoscopic examination, however,convinced one that this was due merely to very marked trabeculation and at the time of operation (prostatectomy) examination failed to reveal the presence of diverticulum.

In one case the condition was suspected from the history and the tumor was felt by the rectum. Cystoscopic and X-ray examination were not available due to the fact that the man had been treated as a case of stricture of the urethra by one of our advertising specialists. Many false passages had been made and it was practically impossible to pass any instrument into the bladder. At this point the case was brought to me by some friends and after using every available means of entering the bladder without traumatizing the structures, I opened the bladder suprapubically and being on the lookout for the diverticulum, located the opening rather easily.

In another case, (case 4), the cystoscopic appearance of the surface of the growth gave it the appearance of originating in the diverticulum. Cystograms taken to decide this point were negative. The reason is obvious from Dr. Geraghty's report on the specimen as reported in the case history.

In case 5, which has not yet been operated upon after obtaining his history I was very much disinclined to cystoscope him as it did not seem to be indicated. The urinary findings were negative. X-Ray examinations of the kidneys showed no stone. No spondylytis was observed; but the patient was so insistent upon the fact that his back ache was definitely of kidney origin that I finally made the examination. There was marked trabeculation of the bladder wall, a well defined median bar, slight enlargement of the right lobe and four diverticular orifices, two on each side of the bladder in the region near the ureter openings. In this case his diagnosis was made by the cystoscope alone by reason of the fact that the orifices definitely showed themselves to be those of diverticula. However, cystograms were made in addition to determine the size of the pouches and to what extent there might be pressure on the ureter and I think that the picture shows just why his pain, his back ache, is confined mostly to the right kidney and not felt on the left side as well. Pressure on the ureter, on the rectum and on the bladder itself must be considered in listing the symptoms. This case (5), has not yet been operated upon and so I can not as yet prove whether or not his back ache is due to pressure on the ureter by the diverticulum or whether it is due to his median bar obstruction. Sciatic pain

was produced, I am sure, in case 4, by pressure on the nerves.

TREATMENT

The only effective treatment is excision of the sac, unless this is contraindicated by other complications than the usual accompanying obstructions; for example, pyelitis, chronic sepsis, etc. The method of operating may be varied to suit individual cases; some will prefer inserting the finger into the sac, others will try the method of inserting gauze packs within the sac to make a solid tumor. In certain cases the inversion methods may be used employing either traction or suction, which is Young's latest method. All of my own cases were operated upon under spinal anaesthaesia which gives the complete relaxation of the muscles permitting an easy dissection in the paravesical tissues which is often necessary, for example, in case 2 where the sac was adherent to the right ureter seminal vesicle and rectum, I will not weary you with long case histories, but briefly will recite the salient factors of cases 1 and 4.

Case 1. Rancher, 60 years, chief complaint, difficult urination. History of prostatic obstruction for eight years. Began with difficult urination, later a constant desire to urinate during day and marked frequency at night (10 times); enuresis one and half years ago. About two months ago had sudden severe pain in the side (left) with chills and fever. Two weeks ago began to pass thick pus through urethra with relief of pain in the side; at this time had severe spasms of the bladder.

General appearance; very cachectic; chronically and desperately ill; pulse 96, temperature 101 F., B. P. 160-110. Wassermann negative.

Urological: residual 300cc.; bladder washed clear and then sudden gush of pus. Rectal examination disclosed a markedly hypertrophied prostate. Blood urea 0.72 gm. per liter.

Cystoscopic examination shows a chronic cystitis of marked degree; the right wall of the bladder is heavily trabeculated and shows many pits; there is a large dark area high up on the posterior wall which has the appearance of a wide mouthed diverticulum. A small stone, mulberry in shape, but phosphate in character, is seen near the right ureteral orifice. Vesical neck markedly contractured by a large projecting middle lobe adenoma and one of the right lateral lobe; the left lobe was likewise enlarged but not to the same extent as the right one.

Ureters catheterized: R. pus-colon bacilli-urea 1. 4%-alb. trace. L. pus-colon bacilli-urea 1.2%-alb. trace.

Phenolphthalein: 1cc. intravenously. R. 7 min. 4.5% in 20 min. L. 9 min. 3.0% in 20 min.

We decided that operation was inadvisable, but the patient insisted that he be given the chance to get well. Suprapubic drainage was then determined upon, but at operation the bladder wall around the diverticulum was so indurated and infiltrated with pus that it was decided to excise the diverticulum at the same time. This was done with a great deal of difficulty on account of the extensive paracystitis. The patient did fairly well in spite of his evident sepsis until an uremic condition set in two weeks later death following in a few days.

The second case, which is of more than passing interest was an Italian 42 years of age. Wasserman was negative. His symptoms dated back seven months; had hematuria, nocturia, and frequency. The bleeding was thought by one man whom he consulted to come from the left kidney, which

was removed; cystoscopic examination showed a sessile tumor about three centimeters in diameter projecting about one-half centimeter above the surrounding mucosa and its margin sharply delimited. Its location was to the left of the median line at the junction of the superior and anterior walls of bladder. No other tumors observed anywhere. There seemed to be a dark area, possibly a diverticulum opening in the middle of the tumor and as I had been desirous of finding a diverticulum with a tumor originating within it, I made cystograms to see if diverticulum was present in this case; but they failed to reveal any such condition. At operation (spinal anaesthesia) during the preliminary loosening up of the bladder a large mass, the size of an orange or league base ball was found to project backward and lateralward (left) to be attached to the bladder at the site of the tumor, narrowing down to an area of attachment coextensive or nearly so with the diameter of the tumor within the bladder. I then felt sure that we were dealing with a diverticulum, in which a cancer had originated and excised the tumor and sac in toto believing that the tumor had entirely occluded the opening of the diverticulum. Dr. Waite and I disagreed about this and we submitted the specimen to Doctor Geraghty at the Brady Urological Institute at Baltimore. He reported as follows:

"The specimen consisted of a diverticulum, the wall of which is infiltrated with carcinoma and the carcinoma grows across the diverticular orifice completely closing it; the corcinomatous mass having started either in the mucous membrane of the orifice of the diverticulum, or just inside of the diverticular sac and so grew that it formed a complete plugging of the outlet of the diverticulum. There probably was present a cystitis in the diverticular sac, and then plugging of the orifice led to an abcess formation in the free portion of the sac.

"The specimen is a beautiful one and extremely rare. We have had four or five specimens in which carcinoma has ocurred in the diverticulum but this is the first one I have seen in which the carcinoma completely fills the orifice leading to an abscess formation in the rest of the sac. It is principally interesting from that standpoint and I do not feel there is any doubt but this mass should be classed as carcinoma in a diverticulum."

In closing we wish to emphasize:

First. That every case of prostatic obstruction ought to be examined for diverticulum so that a complete functional result may be obtained, and

Secondly. That many obscure symptoms referable to the genito-urinary tract will appear in their true light if a thorough and accurate examination has disclosed the true condition present, and

Thirdly. Diverticulum of the bladder is no longer to be thought of as a rare condition, but will be found freuently complicating many cases of urinary obstruction as well as being independently the cause of puzzling conditions in genitary urinary surgery.

VALUE OF A SYSTEMATIC METHOD IN THE EXAMINATION OF RADIOGRAMS OF PULM ONARY TUBERCULOSIS.

CHARLES W. MILLS, M. D., Tucson, Arizona.

In this short talk on the use of the X-Ray in diagnosing pulmonary tuberculosis the principal point I wish to make is the great advantage to be gained by examination of radiograms according to the systematic method and routine. All of you who have ever tried to make X-ray pictures know the necessity, in order to obtain good plates, of the most careful and systematic attention to small details. In examination of the finished plate I would urge the same careful application of system, and would like to suggest to you a routine which I have found very helpful, illustrating, as I go along, each point by radiograms.

Let me first describe the main points which we should try to determine in the examination of a plate from a case of suspected or proved tuberculosis. The first point to be determined is whether the plate shows any deviation from the normal, of such character as to suggest pulmonary disease. Secondly, if such abnormalities are present, do they suggest that the disease is tuberculous or non-tuberculous. And thirdly, if of tuberculous character, what information is conveyed as to the type and character of the tuberculous process.

I would suggest in following out this routine that we start first with the parts of the picture aside from the lung fields themselves, and carefully examine in succession the bones, the upper mediastinum, including trachea, main bronchi and aorta, the heart, and the diaphragm, for any abnormalities. We next examine for any pleural abnormalities including fluid, pneumothorax, encapsulated empyemas, or interlobar thickenings.

We next come in our routine to the examination of the lung fields themselves, and take these up in the order of root shadows, bronchial tree, and parenchymal areas of lung.

Having now determined that some abnormality indicative of pulmonary disease is present, we come to the next much harder point of determining whether the disease is tuberculous or not. As this talk is only concerned with tuberculosis I will leave out of the question the differential diagnosis of the non-tuberculous diseases should we decide that our plate belongs to that group. Two points especially I want to emphasize as being helpful in differentiating tuberculosis; first the patchy irregular appearance of the shadows, and second, their presence in the upper half of the lung. Lungs in which no abnormal shadows occur in the upper halves are almost always non-tuberculous. It is, however, in very many cases impossible on X-ray evidence alone to say whether the lesion is tuberculous or not, a point which must be determined from other data.

Finally having determined from X-Ray or other evidence that our picture is one of a tuberculous lung, we should in a guarded and not too dogmatic manner try to draw what conclusion we can as to the type and character of the tuberculous lesions. At the Trudeau Sanatorium, Brown, Heise, and Sampson have made a useful classification, useful from the prognostic standpoint at least, of pulmonary tuberculous lesions as shown by X-ray, into what they call peribronchial and parenchymatous types. Whether their choice of these words rests on a sound patholo-

gical basis may be doubtful but there is no question that we do see these two different kinds of shadows in X-ray plates and that the so-called parenchymatous types occurs in the clinically more serious cases.

The military type of disease also presents a characteristic picture.

And lastly, we may with due caution, attempt to derive some conclusion as to the age of the tuberculous lesions and their present activity.

If whenever you have occasion to examine an X-ray plate you will go at it in some such systematic manner I believe you will discover many small details which might ordinarily be overlooked, and that will be a great help in arriving at a definite opinion.

SURGICAL AND THERAPEUTIC TREATMENT OF TRACHOMA.

By HARLEY YANDELL, M. D., Phoenix, Arizona.

(Read before the Maricopa County Medical Society, May 14th, 1921.)

Many methods of treating trachoma have been described to the medical profession. They all have their peculiar virtues, but what we want is a cure (for many of these are charity cases) in the shortest possible time. I have used the method to be described in seven hundred cases, have compared results many times with the Roller method and the blue stick treatment, and have carefully followed up my cases in the various institutions throughout the Indian service. If this method is properly conducted in an institution, there is, to my mind, no other treatment which approaches so near an ideal in removing the granules from the lids.

The technique is as follows: Patient is placed on the operating table, with proper light and the usual surgical precautions observed in any other lid operation; the head and the lower part of the face are covered with a sterile towel. Operator sits either facing the patient or at the head of the table. Each lid is taken separately, everted and anesthetized by cotton applicator dipped in 10 per cent cocain solution. As soon as the anesthesia is obtained all the granules that can be seen with the naked eye are opened either with a cataract knife or Hagedorn needle. The nurse touches the field with the cocain solution in case the patient complains of pain. After touching the somewhat bloody field of operation with full strength adrenalin, make use of the Loupe and open other granules which cannot be seen with the naked eye. After all of the granules in all the different fields and recesses of the conjunctiva have been opened in this manner, massage the entire field with gauze dipped in 1:2000 bichloride wrapped on a slightly curved, flat, narrow piece of steel, until conjunctiva is as smooth as velvet. This is done without sacrificing the conjunctiva. The entire field, now smooth as velvet, is touched with alcohol. After this, touch the entire field with three percent silver nitrate. The application of hot owels is continued until the congestion and edema have subsided. Patient is given dark glasses and he goes about his business until evening, when the conjunctiva and lids are anointed with yellow oxide of mercury with adrenalin (Mulford's). On the following morning patient is again

placed on the operating table, lids are everted, and with the aid of the Loupe, a search is again made for any remaining granules. If any are found (which rarely occurs) they are treated as above described. Then, at this time, two or three drops of 10 percent copper sulphate solution in glycerine are placed on the conjunctiva. In the afternoon, the patient is again placed on the operating table, upper and lower lids everted and the entire area is immersed in sour buttermilk for five minutes; if this is not available, a saturated solution of rennet is used in the same manner. This is a daily procedure. This institutional method is applicable to all cases where granules exist and should also precede all operations for removal of the tarsal plates.

Just a word about pannus and the technic for its destruction. Anesthetize and with a very fine pointed hemostat forcibly crush the vessel or tissue just at the limbus and daily instill dionin, beginning with five per cent solution, gradually increasing until full strength is used. The pannus will disappear in a short while.

BOOK REVIEWS.

TUBERCULOSIS AND HOW TO COMBAT IT. A Book for the Patient. By Francis M. Pottenger, A. M., M. D., LL. D., F. A. C. P., Monrovia, California. St. Louis, C. V. Mosby Company, 1921. Cloth, 273 pages. Price, $2.00.

This book is an excellent addition to the three or four works of like character already available. Designed as a work of information and instruction for the patient it may also be read with profit by the physician. Explanations seem clear and succinct enough for any lay reader and the views expressed will be endorsed by all physicians interested in tuberculosis except those in the chapter on tuberculin, the use of which the author enthusiasticallyadvocates. Since the book was not written for the author's patients alone it might have been well to state that the opinions therein expressed are not accepted by certain other men also well qualified in the care of the tuberculous. The consumptive and the diabetic are now well supplied with literature instructing them in the way they should go; the patient with chronic hypertension is still unprovided for. E.A.D.

DECEMBER
FIRST, SECOND
and THIRD

are the dates when Phoenix
will be the host of the

Medical and Surgical
Association of the Southwest
and the
Pacific Coast
Roentgen Ray Society

THE MODERN METHOD OF FEEDING INFANTS.

Modern infant feeding calls for a formula suited to the individual requirements of the individual baby. The physician now realizes that an infant deprived of breast milk must be fed as an individual. The nourishment from the infant's food is principally derived from cow's milk. The "foods" contain no mysterious life-giving elements but are used as modifiers. As such they are indispensable for their carbohydrate content, the added carbohydrate being necessary to make up for the loss of carbohydrate when cow's milk is diluted with water. It is also important that these "foods" are given as carbohydrates and should not contain a mixture of vegetable protein and fat, since the cow's milk supplies animal protein and fat in proportion suitable for the growth of most babies.

Infant feeding should be directly under the control of the physician. Realizing this important fact, Mead Johnson & company of Evansville, Indiana, have manufactured a line of Infant Diet Materials suitable for the individual requirements of the individual baby. These products do not carry laity directions on the trade packages. Such directions on a package of food is the unsurmountable wall that differentiates between individual infant feeding and indiscriminate infant feeding. The physician may prescribe Mead's products with perfect confidence.

Mead's line of Infant Diet Materials consist of Mead's Dextri-Maltose (Dextrins and Maltose), Barley Flour, Dry Malt Soup Stock, Casec (Calcium Caseinate—for preparing Protein milk), Arrowroot Flour and Cerena, all of which are supplied without any directions on the packages. Over and beyond the gratifying results obtained from Mead's products, the physician is given unlimited scope to his own creative talents, hence there will be a greater number of better babies in his immediate neighborhood. The mother who uses Mead's Diet Materials at the direction of her physician is disposed to place credit for the welfare of her baby where credit belongs, i. e., to the doctor. The Mead Johnson policy means the realization of an ethical ideal.

Interesting publications on Infant Feeding , prepared by Mead Johnson Company are well worth writing for. Letters addressed to them will receive personal attention from their Scientific Department.

REQUIREMENTS OF THE NATIONAL BOARD OF MEDICAL EXAMINERS

The National Board of Medical Examiners has just completed the first five years' work and with it the trial period of its usefulness. The principle which this Board has stood for, namely, the establishment of a thorough test of fitness to practice medicine which might safely be accepted throughout this country and abroad, has been widely accepted. Since this Board was organized by Dr. W. L. Rodman, in 1915, eleven examinations have been held. These examinations have been conducted on the plan of holding at one sitting, a written, practical and clinical test for candidates with certain qualifications, namely a four-year high-school course, two years of college work, including one year of Physics, Chemistry, and Biology, graduation from a Class

A Medical School and one year's internship in an acceptable hospital. These examinations have covered all the subjects of the medical school curriculum and have been conducted by members of the Board with members of the profession resident to the place of examination appointed to help them. Such examinations have been held in Washington, Philadelphia, New York City, Boston, Chicago, St. Louis, Rochester (Minnesota) and Minneapolis. During the war a combined examination was held at Fort Oglethorpe and Fort Riley. There have been 325 candidates examined, of whom 269 have passed and been granted certificates.

Starting with the endorsement of the Council on Medical Education of the American Medical Association, American Medical College Association and various sectional Medical Societies, the recognition of the Army, Navy and Public Health Service Medical Corps of the United States and certain State Boards of Medical Examiners, the certificate is now recognized. Also by twenty states as follows: Alabama, Arizona, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Kentucky, Maryland, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Pennsylvania, Rhode Island, Vermont, and Virginia, the Conjoint Board of England, the Triple Qualifications Board of Scotland, the American College of Surgeons and the Mayo Foundation of the University of Minnesota.

There has been such wide-spread demand for an opportunity to secure this Certificate by examination, that the Board has now adopted and will put into effect at once, the following plan: Part I, to consist of a written examination in the six fundamental medical sciences; Anatomy, including Histology and Embryology; Physiology; Physiological Chemistry; General Pathology; Bacteriology; Materia Medica and Pharmocology. Part II, to consist of written examination in four following subjects; Medicine, including pediatrics, neuropsychiatry, and therapeutics; Surgery, including applied anatomy, surgical pathology and surgical specialties; Obstetrics and Gynecology; Public Health, including hygiene and medical jurisprudence. Part III, to consist of a practical examination in each of the following subjects: Clinical Medicine, including medical pathology, applied physiology, clinical chemistry, clinical microscopy and dermatology; Clinical Surgery, including applied anatomy, surgical pathology, operative surgery, and the surgical specialties of the diseases of the eye, ear, nose and throat; Obstetrics and Gynecology; Public Health, including sanitary bacteriology and the communicable diseases..

Parts I and II will be conducted as written examinations in Class A Medical Schools and Part III will be entirely practical and clinical. In order to faciliate the carrying out of Part III, subsidiary boards will be appointed in the following cities, Boston, New York, Philadelphia, Minneapolis, Iowa City, San Francisco, Denver, New Orleans, Baltimore, Galveston, Cleveland, St. Louis, Chicago, Washington, D. C., and Nashville, and these boards will function under the direction of the National Board. The fee of $25.00 for the first part, $25.00 for the second part and $50.00 for the third part will be charged. In order to help the Board the Carnegie Foundation has appropriated $100,000.00 over a period of five years.

At the Annual Meeting held June 13th, of this year in Boston, the following officers were elected, M. W. Ireland,

(Continued on Page Eighteen)